DOCUMENT RESUME

ED 266 435 CS 008 337

AUTHOR Mikulecky, Larry; Ehlinger, Jeanne
TITLE The Influence of Metacognitive Aspects of Literacy on Job Performance of Electronics Technicians.
PUB DATE 4 Dec 85
NOTE 4p.; Paper presented at the Annual Meeting of the National Reading Conference (35th, San Diego, CA, December 3-7, 1985).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Competence; *Electronic Technicians; Employment Experience; Employment Level; Job Analysis; *Job Performance; Job Skills; *Literacy; *Metacognition; Reading Skills; Writing Skills

ABSTRACT

A study explored the relationship between literacy and on-the-job performance. Subjects were 29 electronics technicians who were employed at a technical school, a naval base, a major Fortune 500 electronics plant, and a small local electronics plant. Subjects, classified according to three different employment levels (training, experienced, and supervisory), were observed, interviewed, tested, and rated according to job performance. Results indicated significant differences among experience levels in terms of literacy abilities, job literacy demands, and literacy strategies and purposes employed on the job. In addition, there appeared to be relationships between electronics technicians' rated job performance and their ability to handle job literacy demands. Superior job performers seem to be able to express and explain to others the important aspects of what they read. (DF)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED266435

(Abstract)

The Influence of Metacognitive Aspects of Literacy on Job Performance of Electronics Technicians

Larry Mikulecky and Jeanne Ehlinger
Indiana University-Bloomington

National Reading Conference
San Diego, California December 4, 1985

A major problem facing society is the growth of higher level literacy demands in the workplace. Several research studies have documented the nature of workplace literacy demands, but only a few have attempted to assess the relationship between literacy abilities and on-the-job performance.

This study involved observing, interviewing, testing, and rating the job performance of electronics technicians from three different employment levels (i.e. in training, experienced, and supervisory). Data were analyzed for differences among level of experience groups and the relationships of rated job performance to literacy related factors. Subjects were 29 electronics technicians who volunteered from a technical school, a naval base, a major Fortune 500 electronics plant, and a small local electronics plant.

Job related reading time averaged nearly two hours daily (104.3 minutes) and job related writing added another half hour (32.6 minutes). Only 15 minutes of total reading time was uninterrupted and only a minute of writing time. Nearly all job related literacy was problem solving in nature. Reading ability, as measured with job related cloze tests, did not significantly correlate with job performance and could not discriminate electronics supervisors, experienced workers, and trainees. Metacognitive aspects of literacy did consistently and significantly correlate with job performance.

Results are discussed in terms of
the two general working hypotheses:

1. There are significant differences among experience levels of electronics technicians (Trainees, Experienced, and Supervisors) in terms of Literacy Abilities, Job Literacy Demands, and Literacy Strategies and Purposes employed on the job; and

2. There are significant relationships between electronics technicians' rated job performance and how technicians handle job literacy demands. Major areas of difference between low and high job performers will relate to metacognitive uses of literacy.

Empirical data in relation to hypotheses are presented in Table I on the next page. Excerpts from structured interview data follows on pages 3 and 4.

CS008337

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Jeanne Ehlinger
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

TABLE I

RESULTS CONCERNING RANK ON LITERACY MEASURES IN RELATION TO EXPERIENCE LEVEL (HYPOTHESIS 1) AND PERFORMANCE (HYPOTHESIS 2)

INSTRUMENTS	DESCRIPTION OF LITERACY MEASURE	HYPOTHESES #1 Relationships of experience level to literacy (Kruskal-Walliis)	#2 Relationships of job performance to literacy (Kendall r)
Observation Checklist For On-The-Job Behavior	1. Mode of activity (uninterrupted for 60 or more seconds)		
	-reading	NS	NS
	-writing	*	*
	-doing	.02	NS
	-listening	*	*
	-speaking	*	*
	-multi-modal tasks	.04	NS
	2. Total time spent		
	-job reading	.038	NS
	-job writing	NS	NS
	-job literacy (sum of job reading and job writing	NS	NS
	3. Purpose for activity		
	-to do	.003	NS
	-to learn	NS	.007
	-to assess	*	*
	-to reach agreement	NS	NS
	-to confirm	.006	NS
	-to diagnose	NS	NS
	-to socialize	NS	NS
	-to do and learn	.006	NS
	-to instruct	.000	.041
	4. Strategies used		
	-read and do	.001	.018
	-read and rehearse	*	*
	-read and assess	.015	NS
	-skim for main idea and detail	*	*
	-ask questions	.03	NS
	-focus attention	NS	NS
	-other	NS	NS
Reading Comprehension Tests			
-General Cloze	General reading ability	.05	NS
-Job Cloze	Specialized job reading ability	NS	NS
-Anchored Rating Scales	1. Show key ideas	NS	.002(+.45)
	2. Summarize key ideas and relationships	NS	.001(+.50)
	3. Suggest applications of material	NS	NS

NOTE: * Denotes no analysis performed because of insufficient data. (Less than 10 minutes observed in 8 hours.)

BEST COPY AVAILABLE

Type of Job Literacy

Over 73% of electronics workers indicated that job related literacy tasks involved reading, writing, and doing. Materials included test procedures, manuals, reports, and combinations of these. A typical comment describing the type of reading performed by electronic technicians follows:

EXPERIENCED I use reading for test procdeures, reading and interpreting test requirements and operating summaries, reading equipment manuals to check functions of test equipment. I write personal notes on work completed and keep log books of tests run up-to-date.

A major purpose articulated by most workers for job related reading and writing was to identify and locate problems on the job. The following comment is illustrative:

TRAINEE When there is a problem on the circuit board I look at the schematic to see what parts are causing the problem, then go to xerox of board, check output/input at the points along the line, then change.

A typical electronics technician is involved in activities that are multi-modal in nature (moving from reading to writing to doing to speaking) an average of 32[illegible] minutes daily. Though the range of multi-modal activity stretched from 63 minutes to 457 minutes, it appears clear that typical working time for electronics technicians involves regular interruption of mode (reading, writing, speaking, listenin, doing) to solve problems. A typical comment follows:

EXPERIENCED I log in part numbers; check specs on card for frequency ranges, etc.; calibrate computer system for part in question (memorized); type in specs; determine whether piece is bad or if a glitch in system exists. If bad, I rerun for check.

Superior Job Performers

Superior job performers appear to possess the ability to express and explain to others the important aspects of what they read. In focusing attention, superior performing electronics technicians did things like underlining key word or phrases, making notes, and highlighting with yellow markers. They did these things on a regular basis and even went beyond basic focusing techniques to develop techniques of their own. 60% of superior job performers used self-developed focusing techniques applicable to their specific job tasks. Comparing techniques of superior and adequate rated supervisors who had similar job demands provides a useful perspective on what separated these groups. Workers were asked, "Do you have any techniques to make yourself more efficient and/or accurate with reading and writing on the job?" A typical superior worker response follows:

SUPERVISOR I developed a file system in which the documentation (basic ID , other information) information is recorded on a separate file card (5 x 7) for each part and filed according to the company which manufactures the part. I coordinate data on a 5 x 7 card and file according to vendor -- saves a lot of time pawing through a filing cabinet.

BEST COPY AVAILABLE

In contrast to these relatively sophisticated self-initiated techniques for managing information, the only technique reported by the adequate classified supervisor was sometimes using a yellow marker.

Observation and test data revealed superior performing technicians to be competent at identifying key concepts and articulate at summarizing them. They were more often observed to instruct others and use these abilities to focus and summarize written material. Superior performers had the ability to discuss and elaborate on the metacognitive functions of their jobs, and read well enough to instruct others, They also reported more decision making and problem solving and generally articulated more sophisticated methods for handling information. A clear majority (71%) of superior job performers said that the most difficult or complicated ways they used reading were to make decisions and solve problems, as opposed to only 12% for adequate job performers. The following comments illustrate this and highlight metacognitive and problem solving differences between superior and adequate job performers.

SUPERVISOR When I encounter a new board I'm not familiar with, then I have to really study drawings, schematics, then see how they match, then look at the board to follow what schematic shows. (Measure at points to follow along to get right readings.) Some of the new test equipment readings must be used with sheet which details test and proper readings.

EXPERIENCED Trying to decide borderline reject; then go to specs and check for range; then make a decision. I accept what they say on specs in terms of range but I only accept mid-range.

SUPERVISOR I interpret yield report information to employee: show problem and how to check or fix it; how to evaluate problems; deciding what needs to be done to improve output.

Superior worker comments reflect clear senses of who is writing, the purposes to which literacy is being put and systematic plans that allow for self monitoring and cross checking. For example, "I read the process of how the job is to be done. The terms aren't difficult, steps are not hard, because I know how the machine is supposed to work; read descripton, think of person writing, check for what I see, then tell how to fix." Adequate worker comments reveal a plodding step by step approach: "when the first change doesn't fix it, I go to the next part, then next."

BEST COPY AVAILABLE